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ABSTRACT

Recent reports have confirmed that boys, not girls, are increasingly on the unfavorable side of the gender gap in education and developmental matters. This paper provides an analysis of trends in the gender gap among students in Catholic and public schools during the period from 1972 to 1992 for a select set of variables. Although the gender gap on test scores has received considerable attention in recent years, Catholic/public school comparisons have not been made, and very little attention has been given to variables other than test scores. Data are from three national surveys of high school students, the National Longitudinal Study (1972), the High School and Beyond Study (1980), and the National Educational Longitudinal Study (1992). The gender gap across Catholic, single sex, and coeducational schools is also considered, as well as several important demographic trends in Catholic schools. There is no evidence for a one-way gender gap favoring males beyond 1992 in either Catholic or public schools. As of that time, females possess an advantage on most central educational outcome indicators, on average. Movement towards this 1992 state of affairs can be observed in the trend results as early as 1980. At the same time, females have lost a gender gap advantage that they previously held on two other variables that are indirectly related to educational outcomes. All of this suggests that the broad nationwide efforts to bring about gender equity in schools has been effective. As a result of these trends, however, boys rather than girls are now on the short end of the gender gap in many school outcomes. Two appendixes describe the national survey data sets and list the variables studied. (Contains 8 figures, 3 tables, and 55 references.) (SLD)

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Achievement and Equity in Catholic and Public Secondary Schools:

Gender Gap Comparisons from 1972 to 1992

Cornelius Riordan and Kim Galipeau

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Abstract

Recent reports have confirmed that boys, not girls, are increasingly on the unfavorable side of the gender gap in education and developmental matters. In this paper, we provide an analysis of trends in the gender gap among students in Catholic and public schools, during the period 1972 to 1992 for a select set of variables. Although the gender gap on test scores has received considerable attention in recent years, Catholic/public school comparisons have not been made, and very little attention has been given to variables other than test scores. We also consider the gender gap across Catholic single and coeducational schools as well as several important demographic trends in Catholic schools. There is no evidence for a one way gender gap favoring males beyond 1992 in either public or Catholic schools. As of that time, females possess an advantage on most central educational outcome indicators, on average. Movement towards this 1992 state of affairs can be observed in the trend results as early as 1980. At the same time, females have lost a gender gap advantage that they previously held on two other variables that are indirectly related to educational outcomes. All of this suggests that the broad nationwide efforts to bring about gender equity in schools has been effective. As a result of these trends, however, boys rather than girls are now on the short end of the gender gap in many school outcomes.

Achievement and Equity in Catholic and Public Secondary Schools:

Gender Gap Comparisons from 1972 to 1992

An entire body of research demonstrated that females were shortchanged in school prior to 1972. At that time, females were disadvantaged in curricula opportunities, teacher expectations, and they were excluded from critical elements of the extra-curriculum. This situation called out for programmatic and systematic change and this is exactly what Title IX and related legislation and related policy has done. It would be discouraging to assume that the changes in school policy and school law that have been enacted over the past thirty years would have been non-effective. Rather, one would expect that these nationwide efforts would have brought us closer towards gender equity in schools.

In this paper, we provide an analysis of trends in the gender gap among students in Catholic and public schools during the period 1972 to 1992 for a small set of achievement variables. To do this, we draw upon data from three national surveys of high school students conducted by the National Center for Education Statistics (NCES). These data sets are the National Longitudinal Study (NLS 1972), High School and Beyond (HSB 1980), and the National Educational Longitudinal Study (NELS 1992). These surveys represent respectively the graduating high school classes of 1972, 1980, and 1992. Although the gender gap on test scores has received considerable attention in recent years, Catholic/public school comparisons have not been made.

Although the focus of the paper is upon the gender gap, several interesting demographic discoveries emerge in the study of Catholic schools. The demographic trends in Catholic single

sex schools for girls are related to achievement and equity outcomes. These findings shed light on why Catholic single sex schools for girls, once a shining light of educational reform, are now less effective than Catholic coeducational schools in terms of achievement and gender equity.

Trends in the Gender Gap

Recent reports have confirmed that boys, not girls, are increasingly on the unfavorable side of the gender gap in education and developmental matters. For example, enrollments in institutions of higher education in the 1990s favor females by a ratio of 54 to 46 (Green et al., 1993). As recent as 1980, the ratio was 50/50. Of course, in 1970 the ratio favored males by a margin of 59 to 41. Similarly, in 1971 only 43 percent of those people who received a baccalaureate degree and 40 percent of those who received a master's degree were women, compared to 54 percent for each degree in 1993 (Kopka and Korb, 1996). Because of this large gap favoring males just 25 years ago, it is easy to understand how the reversal has gone un-noticed. Among African and Hispanic-Americans, the gap actually favored females in 1970 and has expanded substantially during these past two decades (Kopka and Kolb, 1996).

We can see the problem emerging over these past two decades by looking at data on occupational expectations among males and females. In 1972, there was only a small gap favoring females in terms of those high school graduating seniors who expected to attain a "professional" occupation by the age of thirty. By 1992, this gap had increased dramatically which is not surprising since more females than males were attending college in the 1990s (Green et al., 1995). This pattern is repeated throughout Europe (The Economist, 1996). The issue has

recently become a matter of concern to college officials interested in maintaining a balanced male/female ratio (Gose, 1997).

The U.S. Department of Education's Condition of Education 1995 concluded that "the gap in reading achievement (favoring girls) is roughly equivalent to about one and a half years of school." (p.13). In the July 7, 1995 issue of Science, Larry Hedges and Amy Nowell show that boys' writing skills are significantly and profoundly below the skill levels of girls. Other researchers (Jones et al., 1992) confirm that girls usually outperform boys in reading and writing, as early as the fourth grade. It is true that all of the above sources show differences favoring boys in mathematics and science, but the differences are smaller. And, in fact, some of the data does show that the achievement test score differences in mathematics have been reduced considerably as a result (Baker and Jones, 1993; Lee et al., 1996; Linn and Hyde, 1989). Lee et al. (1996) suggest that a more balanced approach to the study of gender equity is in order.

Educational Testing Service (ETS) has just released a four year study reinforcing this emergent view regarding the gender gap. In this report, Willingham and Cole (1997) analyzed data from 400 different tests from more than 1500 different data sets. They found that for most subject matter tests, gender differences were very small and whenever a gender difference was found it "cut both ways." The researchers acknowledged that the results contradict the view that girls need to catch up with boys. In particular, they note that "12th grade girls have substantially closed the familiar math and science gap over the past 30 years but there continues to be a fairly large gap in writing skills that boys have not closed" (ETS, 1997, p.10). Nowell (1997) found exactly the same results using pretty much the same data.

But there are other indicators that deserve attention as well. Girls have consistently

obtained better grades and higher class ranks than boys (Alexander et al. 1982). In NELS 1988, Hafner et al., 1990 found that 8th grade girls were significantly more likely (by 6 percent) than boys to be in the highest quartile of self reported grades, and were significantly less likely (by 7 percent) to have repeated at least one grade. More boys than girls suffer from learning disabilities. Approximately three times as many boys as girls are enrolled in special education classes (Smith et al. 1995). More boys than girls are involved in all types of crime, delinquent and violent behavior, as well as the use of alcohol and drugs, both in and out of school (Hafner et al. 1990; Duke, 1976). Rich et al. (1992) found that although girls experience higher rates of depression and suicide ideation, boys experience more loneliness and substance abuse. Moreover, Rich et al. discovered that boys were less likely than girls to seek professional help when they did feel suicidal. Numerous studies have found that alcohol and tobacco abuse is significantly greater among boys than among girls (Clayton et al, 1986; Beck and Summons, 1987; Reinherz, 1993). Finally, Hetherington (1993) and Cherlin (1992) have reported that boys face greater problems than girls adjusting to the divorce of their parents.

A recent report on the behavior patterns of college freshman determined that men spend most of their time exercising, partying, watching TV or playing video games--almost twice as much time as women on these activities. By contrast, college women, spend more time than college men talking to teachers, in student groups, reading for pleasure, studying and doing homework, and in volunteer work (Astin, 1995).

Despite this array of male deficits, virtually all efforts continue to be targeted towards the problems of girls. For example, the American Association of University Women has committed funds for several studies that have received national and international headlines. These studies

have resulted in several publications: How Schools Shortchange Girls (AAUW, 1992), Hostile Hallways (AAUW, 1993), and School Girls:Young Women, Self-esteem, and the Confidence Gap (Orenstein, 1994). These reports have captured widespread attention, and are often cited because they contribute like any study to the overall picture of what is going on. But what is curiously missing here are studies that address educational and developmental outcomes in which boys are now (and in some cases always have been) at a disadvantage.

It is interesting to note that the AAUW commissioned another study (Lee et al, 1996) that was completed recently and which found the very kind of inconsistent results regarding the gender gap that we have described above. Since the results were not supportive of the view that schools only shortchange girls, it was given virtually no media attention by the AAUW who commissioned it. In fact, Lee et al (1996:36) discovered that "some gender differences favor girls (engagement and reading) and some favor boys (science and social studies)". There were no observed gender differences in mathematics (see also Lee, 1997, p.139).

With the October 1998 release of Gender Gaps, (AAUW, 1998), they now sound the alarm to the crisis of computer technology as the next battle zone where schools are still shortchanging girls. In actuality, the gap is 5% (25% of girls compared to 30 % of boys take computer classes). Moreover, they cast a negative aspersion on the fact that more girls than boys enroll in word processing and data manipulation courses, despite the fact that these courses are extremely useful for professions such as law, medicine, investment banking, and finance.

Over the past several years, at least four NCES trend reports have considered this issue as part of a larger study of trends from 1972 to 1992 (Green et al. 1995; Green, 1993), 1980 to 1990 (Rasinski et al. 1993), and 1970 to 1993 (Kopka and Korb, 1996). In each of these reports, a set

of educational outcomes such as educational and occupational expectations and test scores were investigated including the male/female differences. For example, Green et al. (1993) report an important transformation on type of school program (curriculum or track placement) that has occurred among high school seniors from 1972 to 1992. During this time period, the percentage of females in a college track has increased from 43 to 49 percent while the percentage of males has decreased from 48 to 46 percent. In other words, the gender gap has reversed on this variable Albeit a small reversal, the 3 point difference favoring females in 1992 is still significant.

All of this raises the possibility that boys may be increasingly disadvantaged in school especially in certain vulnerable sectors of school and/or among certain vulnerable sectors of the social structure. Specifically, boys might perform and develop less well in public schools rather than private schools. Similarly, greater gender equity may have been achieved in Catholic schools than public schools.

Catholic and Public School Studies

It has been shown repeatedly that the greater effectiveness of Catholic schools vis a vis public schools is with minority and/or disadvantaged students. Among advantaged students from homes of high or middle socioeconomic status, the difference between Catholic schools and public schools is small and often insignificant in terms of academic outcomes. Coleman and colleagues (Coleman, Hoffer, and Kilgore, 1982; Hoffer, Greeley, and Coleman, 1985; Coleman and Hoffer, 1987) demonstrated that Catholic schools provided greater equality and greater achievement than public schools among comparable students (see also, Bryk, Lee, and Holland, 1993; for opposing

views, see Alexander and Pallas, 1986; Willms, 1985; Jencks, 1985). Using data from the high school class of 1982 (HSB), these researchers found (1982:194) that "achievement differences between students from advantaged backgrounds and those from disadvantaged backgrounds are considerably less in Catholic schools than in public schools". This much publicized finding led all of these researchers to justifiably conclude that Catholic schools should be viewed as providing the ideal of the "common school" rather than public schools.

Several theories have been offered to account for this greater capacity of Catholic schools to generate both greater achievement and greater equity. Coleman and Hoffer (1987) and later Bryk, Lee, and Holland (1993) have argued that the strength of Catholic schools was the existence of functional communities between the school and the home. These communities provided social capital in the form of attention and care that was deficient especially for disadvantaged students. Moreover, as functional communities, Catholic schools were able to provide more order and discipline, a high academic ethos with less tracking and higher expectations for everyone. These Catholic school policies were the result of a more effective authority and control structure that was made possible through the functional and value community that was shared by parents, students, teachers , and administrators. Others have added that some of the greater achievement and greater equity may be due to the single sex organization of some Catholic schools (Riordan, 1985, 1994, 1990; Lee and Bryk, 1986; Bryk, Lee, and Holland, 1993), and still others have maintained that the use of school uniforms conceals home background differences and enhances discipline (for a review, see Brunsma and Rockquemore, 1998).

Since Catholic schools are more effective in reducing the achievement gap between blacks

and whites, and between poor and affluent students, it is reasonable to predict that this "equity" effect might generalize to gender. In this paper I test the hypothesis that Catholic schools are more effective than public schools in producing equity in educational outcomes among females and males, by having greater effects on the former rather than the latter. Moreover, I do this for three different time periods (1972, 1980, 1992), and for Catholic coeducational and single sex schools separately.

In view of interest in the potential of single sex schooling that has arisen in the past decade, it is useful to examine the results found in Catholic schools separately for coeducational and single sex schools. Drawing upon the emergent research, one might expect that there would be greater gender gap advantages to girls in single sex schools. Consistent with a wide body of school effects research, however, research has shown that single sex schools are more effective than coeducational schools, but only for disadvantaged students, i.e females, minorities, low SES youth (Riordan, 1990, 1994,1998; see also, Bryk, Lee, and Holland, 1993). Over the past twenty years, the demographic character of students in Catholic schools has become increasing affluent (Baker and Riordan, 1998, Riordan, 1997) and recent research has reported that students in Catholic single sex schools do not outperform their counterparts in coeducational schools (LePore and Warren, 1997). Hence, we might discover that gender gap advantages for girls in single sex schools may have diminished from 1972 to 1992. Unfortunately, it is not possible to apply an analysis partitioned by race or SES here because (1) there are too few minorities in Catholic schools in 1972 and (2) too few low SES students available in Catholic schools in 1992.

It is not inconceivable that girls in single sex schools might achieve more than girls in coeducational schools, but still be on the short end of the gender gap compared to boys in single

sex schools, even after controls are added for socioeconomic background. Historically, there have been substantial differences in the SES backgrounds of students in these schools. Students in boys' schools have held higher SES that girls in single sex schools. This being the case, any raw score advantage for males in single sex schools is reduced when SES is controlled. Also, there is a widely held view that single sex schools for girls were overly traditional especially in 1972. If this were true, there might be a substantial gender gap outcomes favoring males at that time, but one would expect a reduction in this gap over time. Given the changing demographic character of Catholic schools as noted above, however, it is difficult to predict the results of student outcomes over time.

Research Design, Data, and Methodology

Data from NLS, HSB, and NELS provide an excellent basis for assessing changes in gender effects over the past twenty years (see Appendix A for a description). The strengths of these data sets are longitudinal research. They were essentially designed with this in mind. However, the data can be used to make cross-sectional comparisons over time. The methodological problems of doing such a cross-sectional statistical analysis are detailed in the several NCES reports (Green at al. 1995; Rasinski et al. 1993). With some modifications to NELS, for example, we can compare the NLS 1972 seniors, the HSB 1980 seniors, and the NELS 1992 seniors (after excluding drop-outs, early graduates, and any students who were not 12th graders in the Spring of 1992). We can also compare results for these same students in any subsequent follow-ups for which data are available.

For each data set, we employed one of more flags or variables to remove transfers and

dropouts from the analysis. Insofar as is possible, we wish to know the effects of gender on school related outcomes for students who attend for a full three or four years of high school. This restriction provides a more stable portrait of both the demographics and student outcomes. Of course, this restriction does not allow us to estimate the patterns of transfers and dropouts and how these might change the demographic patterns and the outcomes. In this research, however, we are searching for the general pattern of gender effects for most students. The analyses of dropouts is not possible within the time frame of this project (dropouts are not even available for NLS 1972), despite the importance of the issue. Any gap favoring females would surely increase if dropouts were included because males are fully 4 percent more likely to dropout than females (U.S. Census Bureau, 1998).

The entire analyses will use the gender gap (male/female difference on outcomes) as the dependent variable. The analyses partitions the results according to school type in order to determine the extent to which school sector conditions the results in gender gap. Virtually all previous studies of the gender gap have not included this important social and school organizational condition in their analyses.

Most previous comparisons of Catholic and public schools have not accounted for the fact that only Catholic schools are both single sex and coeducational. (In 1972, there were a few single sex public trade schools still in operation which were removed from this analysis.) Typically, researchers have overlooked these different types of organization existing in Catholic schools and compared Catholic schools as a whole to public schools. Here, we follow a logic set forth in an earlier paper (Riordan, 1985) in which students attending public schools are compared only to students attending Catholic coeducational schools. Not only are public schools entirely

coeducational, but single sex schools for boys and for girls are themselves very different as we shall see in the demographic analysis.

As is the case in all studies of school effects, "selection bias" is a possible source of invalidity. It is not inconceivable that girls who attend Catholic schools were better performing students relative to boys before they even arrived. If this were the case, a gap favoring girls might falsely be attributed to something about the schools, when in fact, it might be due to something about the students themselves or their families and homes. Throughout the analyses, therefore, a set of home background variables are used as controls for "selection bias". These controls are limited to those variables that are available in exactly the same measured form in each of the data sets (see Appendix B). Normally, one would utilize a more extensive set of background controls, including early test scores to determine and control for this source of spuriousness. In this study, we are limited to controls that are available in all three surveys–specifically, socioeconomic status, family structure, religion, region, and race.

For students in public and Catholic coeducational schools, we estimated the female/male gap for each outcome variable, controlling for home background within each sector. These results appear in Table 1 as the estimated gender gap in each sector, assuming no difference in these background characteristics. Since students in Catholic schools differ from public school students on most of these background controls, we estimated a second set of gender gap scores across school type, controlling for their background characteristics (Table 2). This allows us to compare a predicted score for males and females in each sector under the statistical assumption that the students came to school with similar background characteristics (bearing in mind throughout that the background controls are limited as noted above).

The analysis of single sex schools requires a slightly different strategy. Here we compared the gender gap in Catholic coeducational schools (controlling for background within the sector exactly as noted above) to the gap predicted for coeducational males and single sex females. This analysis allows us to compare the value added, if any, by Catholic single sex schools to that provided by coeducational schools in gender gap terms. Finally, we compared males in single sex schools to females in single sex schools. This allows a view at how single sex schools for girls compare to single sex schools for boys. In all of the tables, we employed the appropriate sample weights and corrections for design effects associated with the two stage stratified sampling process that was used to gather the data.

Although some of the preliminary analyses uses simple mean scores, the multivariate analyses estimates "effect sizes" in the gender gap. Effect sizes are differences between two means divided by the pooled standard deviation of these means (the controlled effect size applies background controls as noted above via a regression equation). This standardizes the effect across the years and allows for comparisons that are not possible using the actual mean scores.

Results

Variables in the three NCES surveys have included a greater variety and number of questions over the course of time from 1972 to 1992. In the National Study of the High School class of 1972 (NLS) there are only a limited number of outcome measures that can be compared to the same measures in 1980 or 1992. By 1980, however, a wider range of variables were included and continued in 1992. Thus, in 1972, only nine outcome variables are available that

were continued in 1980 and 1992. For the 1980 and 1992 surveys, an additional set of items were added to the surveys making a total of 20 dependent outcomes available for analyses. In this paper, however, we focus entirely on three achievement variables and two variables that indirectly effect achievement. In an earlier paper, we have reported the results on the other variables (Riordan, 1998). The advantage of these five variables is their achievement focus as well as the fact that data for these variables are available for all three surveys.

We begin with a preliminary but revealing analysis of simple mean and percent scores on each of the achievement variables. The mathematics and reading scores have been standardized to a mean of 50 and standard deviation of 10. Also included in this preliminary analysis, is an examination of the students' socioeconomic status which will play a role in interpreting the comparative results. Figures 1, 2 and 3 show the trends in the gender gap for reading and mathematics test scores, and for track placement in high school for students in public and coeducational Catholic schools.

One can readily discern two common patterns in all three figures. First, students in Catholic schools generally score higher on both tests and are more likely to be in a college track. As has often been noted, this is due in part to the fact that students in Catholic schools come from home of much higher socioeconomic status (see Figure 4). The Catholic/public gap in student SES has increased dramatically over the past 20 years (for a complete analysis and discussion of this trend, see Baker and Riordan, 1998; Riordan, 1997).

Second, females have made substantial gains over the 20 year time period such that by 1992 the gender gap favors females in reading and track placement, and there is virtually no gap in mathematics. Note especially that the slopes for females are approximately equal in each

school sector. These uncontrolled results were then converted to background controlled effect sizes reflecting the predicted gender gap in each sector in each survey year. This allows us to examine the predicted gender gap in each sector under the statistical assumption that the students came to school with similar background characteristics

Table 1 is divided into two blocks of results for students in public and coeducational Catholic schools. The upper block shows trend changes that are increasingly positive for girls and the lower block shows trend changes that are increasingly negative for girls. The results in Table 1 depict female/male differences (expressed as effect sizes) based on a within school analysis, conducted separately for each school sector. It shows us the gender gap trends within each school, controlling for the background characteristics of students within each sector. It does not reveal what the trends would be if students in each sector shared the same background characteristics (this is the task of Table 2). Therefore, Table 1 is mostly of interest to those readers who wish to know the gender gaps trends in each school type, per se. We reserve the discussion of single sex schools for Table 3 which follows.

In 1972, educational expectations for girls were very low compared to boys (not shown; see Riordan, 1998), and this is reflected in the percent of males and females who are located in a college track. In both public and Catholic schools in 1972, boys are more likely than girls to be in a college track. Also in 1972, boys score higher than girls in mathematics (and in science although this is not included here). These two factors by themselves were probably sufficient to fuel the widely held view that girls were on the unfavorable side of the gender gap at that time, even though there were was no gender gap in reading. On the other measures in 1972, girls outperformed boys-they did more homework and less part-time work. Considering the top panel

of achievement variables in 1972, girls averaged -.07 ES lower than boys in public schools and -.15 ES in coeducational Catholic schools. Hence, based on this set of achievement measures, we can observe a small gender gap favoring boys in 1972.

By 1980, the average gender effect for the achievement outcomes the gender gap favoring males has remained in place for both public and Catholic schools. Some movement towards gender equity, however, has begun to appear in terms of college track placement in the public schools. And we can also observe in 1980 the beginning of an erosion in the favorable outcomes for girls in homework and part-time work.

In 1992, we note that the trend towards gender equity in mathematics and reading, and in college track placement, has now intensified in both sectors. During this period, female achievement on all three measures has far outpaced male achievement in both sectors, especially in coeducational Catholic schools. On the other hand, the negative trends observed in 1980 have increased for females. In 1992, girls do only slightly more homework and work part-time only slightly less than boys. Specifically, in public schools, an academic advantage for girls for time on homework (.42) in 1972 has been greatly reduced to .17 in 1992, and the female advantage of time not working part-time has eroded ever further from .37 to .11. Parallel losses were experienced by females in coeducational Catholic schools. These findings seem reasonable in view of increased participation of girls in sports and other recreational activities over this time period, but they are substantial losses from female advantages held in 1972 and 1980.

In order to simplify these results, Table 1 shows the average gains and losses that have accrued in the gender gap within each of the blocks of table. In public schools, girls have clearly made significant gains relative to boys from 1972 to 1992 on a range of important academic

outcomes. These gains have produced what appears to be a female gender gap advantage of .11 ES in 1992 in public schools. But these gains are accompanied by losses for a set of non-school variables (homework, part-time work). Here, girls have lost considerable advantage that they possessed in 1972. Missing from these analyses, of course, are measures on sexual harassment in schools which would clearly disadvantage females. Also, despite great gains in extracurricular participation, boys continue to dominate in many areas of great importance and value (in our culture) especially varsity athletics.

Turning to the results for coeducational Catholic schools in the right hand side of Table 1, we can observe that the most consistent set of findings is the now familiar eroding of the female advantage from 1972 to 1992 for the two items in the lower block of outcomes. There seems little doubt that this pattern is an accurate reflection of what is happening generally, regardless of whether the school is public or Catholic. The top block, however, shows that females in coeducational Catholic schools have made much greater gains relative to their male counterparts in these schools compared to females in public schools relative to their male counterparts. Here we can see that girls in public schools have a gender gap advantage of .11 ES in 1992 compared to girls in coeducational Catholic schools who have an advantage of .22. Note that girls in Catholic school have achieved at a much faster pace over the 20 years period (gain of .37 ES) compared to girls in public schools (gain of .18 ES). Although they have made greater gains than females in public schools over the 20 year period, they were slightly more disadvantaged relative to their public school female counterparts in 1972.

The question arises as to what the results in Table 1 would be in Catholic schools if students in this sector possessed similar characteristics to those in public schools. It is the case

that throughout all of the years of the survey, but especially in 1980 and 1992, Catholic school students came from homes of higher socioeconomic status. And although we do not have data for 1972, we also know from data in 1980 and 1992 that these Catholic school students had higher academic credentials to begin with (that is, in earlier grades). What would the gender gap trends look like if students in each sector possessed similar home background characteristics? Table 2 provides an answer to this question.

Here we can see more clearly that the average gains are approximately equal to the average losses over the 20 year period among students in public and Catholic schools. In both school sectors, girls have clearly made significant gains relative to boys from 1972 to 1992 on a range of important academic outcomes. These gains have produced what appears to be a female gender gap advantage in 1992. But these gains are accompanied by losses for a set of non-school variables (homework, part-time work). Here, girls have lost considerable advantage that they possessed in 1972. We assume, of course, that less homework and more part-time work are negative outcomes.

Thus, it appears that girls have made gains and suffered losses relative to boys in both public and Catholic coeducational schools during 1972 to 1992. In both sectors, they have experienced the same degree of loss for homework and part-time work. And on three key academic and achievement items, they have experienced approximately the same amount of gain. Of course, when we say that the trends are comparable across the two school types, we mean that they are estimated to be comparable if the students who attended each sector were comparable in home backgrounds. It appears that the larger societal movement towards gender equity in the schools has preceded successfully in both public and Catholic schools.

Figures 5, 6 and 7 depict the trends on the achievement variables for students in Catholic schools. Here our concern is within the Catholic school sector alone, and specifically, how single sex schools for girls compare with coeducational schools in achievement and gender equity. One can easily discern that the slopes for females in Catholic coeducational schools are greater than those for females in Catholic single sex schools. Figure 5 shows that for the reading test in 1992, the gender gap favoring females in coeducational schools is nearly twice as large as the gap between females in single sex schools and boys in coeducational schools. In mathematics (Figure 6), males and females in coeducational schools are nearly at parity while girls in single sex schools score lowest of all groups. Although coeducational females were the least likely of all groups to be in a college track in 1972, they have moved to a position in 1992 that is higher than coeducational males and nearly at parity with single sex females. We would emphasize that most of this change actually occurs during the period 1980-1992 although this is not apparent from the figures. Data for coeducational schools in Figures 1 to 3 are exactly the same, but may appear different in Figures 5 to 7 because the referent point of comparison has changed.

Table 3 presents the results of a background controlled analyses of the gender gap trends for students in Catholic single sex and coeducational schools. Females in single sex schools were compared to males in coeducational schools (left panel of Table 3) and females and males in coeducational schools were compared (middle panel of Table 3 taken directly from Table 1). The right hand panel compares females in single sex schools to males in single sex schools. We need to exercise greater caution with any single effect since the effect size estimates are less stable due to increased standard errors that arise with the much smaller sample sizes in each school type. This is especially true with regard to the results for single sex schools in 1992, where there are

only 94 females and 156 males.

Some might question the wisdom of comparing girls in single sex schools with boys in coeducational schools as we have done here. Is this an appropriate comparison? It is certainly reasonable to simply compare girls and boys attending single sex schools. In fact, Table 3 displays these results in the right panel. Contrary to all other comparisons in this paper, a gender gap favoring boys in single sex schools has actually increased for the three achievement variables from 1972 to 1992. Over the entire 20 year period, single sex males have gained an average of -.19 ES on these three variables relative to single sex females. In this analyses, females also lost the advantage they held in the two indirect variables (homework and part-time work), similar to girls in coeducational schools. These results were confirmed in an earlier paper where girls in single sex schools were losing ground to boys in single sex schools from 1972 to 1992 across the 20 variables (Riordan, 1998). This suggests that Catholic single sex schools for boys either provide greater resources and/or attract better students than Catholic single sex schools for girls, and that this school and/or home disparity is actually increasing.

In fact, Figure 8 demonstrates Catholic single sex schools are increasingly elitist in their demographics. Figure 8 shows that Catholic single sex schools for girls have undergone a metamorphosis regarding the socioeconomic composition of their student bodies. In 1972, students attending Catholic single sex schools for girls were approximately equal to public school students in their socioeconomic background characteristics (see again Figure 4). From 1972 to 1992, their socioeconomic background has undergone a meteoritic rise. Remarkably, girls in single sex Catholic schools have lost significant achievement ground to boys in single sex Catholic schools over the past 20 years while having increased their "selectivity" during this time to a point

that might actually exceed the "selectivity" of boys! One would be hard pressed to uncover a more unequitable social arrangement.

But perhaps, this is not the most suitable comparison. Girls in single sex schools could be compared to boys in coeducational schools since this is who they would be up against if they attended these schools (as is the case for girls in these coeducational schools). Moreover, this is similar to all earlier studies of achievement where comparisons were made of girls in single sex schools with girls in coeducational schools. One can certainly argue that there is some value in a simple comparison of males and females in single sex schools, but it is surely no more valuable than the comparison of girls in single sex schools to boys on coeducational schools. Clearly, there is no absolute basis for the choice of a comparison group. Single sex schools have laid claim to a capacity to provide greater achievement and greater equity for girls, and just as we compare their achievement levels by comparison to girls in coeducational schools, we are destined to compare their equity claims by comparisons to boys in coeducational schools.

Of somewhat greater interest, therefore, are the results shown in the left hand and middle panels of Table 3 where I have compared girls in single sex schools with boys in coeducational schools (left) and girls and boys in coeducational schools (middle). Taken as a whole these results estimate the value added that girls accrue (if any) from single sex schools when compared to what they would obtain if they were in coeducational schools. Several findings immediately stand out in Table 3. In 1972, girls in single sex schools had lower mathematics scores and were less likely to be in a college track than boys in coeducational schools, but they did far more homework and worked far less than these boys. These results are entirely consistent with the results in Table 3 for girls in coeducational schools relative to the very same boys (middle panel). In either case, it

is a picture of traditional female disadvantage relative to males in key academic outcomes, even though the homework and part time work outcomes favors females. These large female advantages in homework and part time work are misleading, however, and paint a stark picture of girls rather insulated from actual success in school and doing a lot of homework for lower track classes.

As early as 1980, however, girls in single sex schools have made substantial strides towards gender equity in the three key academic variables in the top panel, while still retaining an advantage for the two variables in the lower panel. And by 1992, girls in single sex schools have made further gains on the achievement variables, such that the overall average favoring females has increased from -.10 ES in 1972 to +.18 ES in 1992. This gender gap increase, however, is a bit smaller than the increase made by females in coeducational Catholic schools who moved from -.15 ES in 1972 to .22 ES in 1992.

We can contrast the equity experience of girls in single sex schools to girls in coeducational schools more sharply. Here we observe that females in coeducational schools have made greater strides (.37 ES gain) in gender equity than females in single sex schools (.28 ES gain), relative to the very same males in coeducational schools. Using Tables 3 as a guide, one would conclude that the gender gap in 1992 favors females in Catholic schools, on average, despite the losses in female advantage for homework and part time work. The clear cut exception is that boys in single sex schools maintain a gender gap advantage relative to girls in single sex schools (and presumably to girls in the other school sectors as well).

This issue of gender equity is, of course, a different (though related) question than whether or not girls in single sex schools were outperforming girls in coeducational schools.

Previous research has shown that students in girls' Catholic single sex schools did make greater achievement gains than girls in coeducational Catholic schools in 1972 and in 1982 (see Riordan, 1990, Bryk, Lee, and Holland, 1993). By contrast, however, we have noted here that girls in coeducational Catholic schools were achieving at a faster pace and doing much better with regard to the gender gap, especially during 1980-92. Is it possible to resolve this apparent contradiction?

Most of the analyses of Catholic single sex schools versus mixed sex schools has utilized data from ether 1972 or 1980 or 1982. A careful comparison of Table 3 will reveal that girls in single sex schools were faring better than girls in coeducational schools at that time. During the period 1980 to 1992, however, girls in coeducational schools have increased their achievement levels to a greater degree than girls in single sex schools. In fact, it appears that coeducational Catholic schools made the greatest strides towards eliminating the gender gap compared with all other types of schools considered here as a result.

Recent research (LePore and Warren, 1997) on Catholic schools in the 1990s has found that females in Catholic single sex schools do not outperform their counterparts in coeducational schools. This is contrary to the results obtained by Bryk, Lee, and Holland (1993) and Riordan (1990) for Catholic school students in the 1980s. This now seems completely consistent since students in these schools have become increasingly affluent from 1980 to 1992 as Figure 8 demonstrates. Valerie Lee also found no differences in educational achievement between students in single and mixed gender elite independent schools (Lee, 1997). Thus, it appears that from 1972 to 1982 girls in single sex schools outperformed girls in coeducational schools and their achievements also closed the gender gap in comparison with coeducational males. From 1980 to 1992, however, girls in coeducational schools increased their achievement curve surpassing their

counterparts in single sex schools and reversing the gender gap vis a vis boys in coeducational schools.

Conclusions

There is no evidence for a one way gender gap favoring males beyond 1992 in either public or Catholic schools. As of that time, females possess a significant advantage in reading and college track placement and they had achieved parity with boys in mathematics. Although females in Catholic schools (especially coeducational schools) now hold a greater gender gap advantage than do females in public schools, this difference between schools disappears entirely when the home background characteristics of students are controlled. Movement towards this 1992 state of affairs can be observed in the trend results as early as 1980. At the same time, females have lost a significant gender gap advantage that they previously held on two other variables that are indirectly related to educational outcomes. These gaps favoring females would surely be larger if dropouts had been included in the analyses (or if the measures were made at the 10th rather than 12th grade) since males are now 4 percent more likely than females to dropout.

All of this suggests that the broad global efforts to bring about gender equity in schools has been effective. Hypothetically, one might (as we did) have expected that these efforts to raise female achievement might have had greater impact or be limited to higher SES students and/or to private schools. As is often the case, one might have feared that low SES females in public schools would have been left out of the movement towards gender equity. The fact that this is not the case points to the depth and breadth of the nationwide effort to address the needs of girls

in schools.

As a result of these trends, however, boys rather than girls are now on the short end of the gender gap in school outcomes. In 1992, boys are less likely than girls to be in an academic (college) curriculum, they have lower reading test scores, and their mathematics test scores are now (1992) no greater than girls. They also have lower educational and occupational expectations, lower reading test scores, and they expect to complete their schooling at an earlier age. They are more likely to cut class, be suspended, be in trouble with the law, be placed in remedial math and English classes. Boys do less homework, work more at part-time jobs, read less for pleasure outside of school, and watch more TV than girls. They are less likely to be enrolled in a science and mathematics class sometime during the 10^{th} to 12^{th} grades, and they have a lower sense of environmental locus of control. They feel no more safe at schools than girls (for an analyses of these additional trends, see Riordan, 1998).

In addition, boys are more likely to drop out of school, obtain lower grades and lower class ranks than girls, and they are more likely to suffer from learning disabilities. Men are less likely to attend college and while in college they spend more time than women exercising, partying, watching TV or playing video games. Consequently, they are less likely to graduate from college than women. As a whole, boys are not doing well in school, and this is probably an understatement if we were to consider high risk youth. In addition to the findings in this paper, and the citations in the introduction, two recently released studies provide further confirmation for the above conclusions (see, Harris, 1997; Kleinfeld, 1998).

Considering only Catholic schools, we have found that females in coeducational schools have made greater gains over the twenty year period 1972 to 1992 than females in single sex

schools, especially during the 1980 to 1992 period. In fairness, this greater movement towards gender equity by females in coeducational Catholic schools was necessary since there was a greater disparity favoring males in Catholic coeducational schools in 1972.

We have discovered that girls in single sex schools experienced significant losses in the gender gap relative to boys in single sex schools on the key academic variables items during the 1972 to 1992 time period. They clearly are on the unfavorable side of the gender gap as of 1992 on these three achievement outcomes in comparison to boys in single sex schools. In fact, their situation has worsened since 1972 when they were at parity with these boys whereas now they score significantly lower, on average. At the same time, girls in single sex schools have lost the advantage they once held on the two variables that are indirectly related to academic outcomes, along with females in coeducational schools (Catholic and public).

Quite remarkably, all of this has happened while Catholic single sex schools for girls have become dramatically more selective and elitist. In 1992, these schools are even more selective than Catholic single sex schools for boys, and far more selective than students attending coeducational Catholic schools. This dampers some of the enthusiasm that has emerged in recent years regarding the greater effectiveness of single sex schools for girls. Again, we would repeat that this set of outcomes is not inconsistent from those studies which have demonstrated that girls in single sex schools outperform their female counterparts in coeducational schools. In fact, this greater single sex schools effect can be observed in the tables during the 1980 time period. The greater gains for females in coeducational schools occur during the period 1980 to 1992. Moreover, it is consistent with earlier studies that show single sex school effects are generally limited to females of low socioeconomic status (which no longer characterizes Catholic single sex

schools for girls).

There are, of course, other factors that do require consideration in estimating the direction of the gender gap. One of these factors is the degree of sexual harassment that occurs both in and out of school. Unfortunately, the NCES data sets do not provide data on this except during the NELS 1992 survey. There is, however, one question concerning the degree to which the student "doesn't feel safe at school" and surprisingly, there is no male/female difference on this variable in 1992 whereas girls did report being less safe in 1980 in the public schools. Females in Catholic schools (both single and coeducational report the greatest degree of safety relative to their male counterparts.

Out of school, however, might be an entirely different matter. In fact, in a nationwide survey in 1993 girls reported that they had been sexually harassed to a greater degree than boys along a wide range of specific harassment behavior (AAUW, 1993). On average, 83 percent of the girls and 60 percent of the boys had received unwanted sexual advances either in school or the school ground or coming to and from school (Lee et al. 1996). There were several items, however, in which boys were more likely to have been harassed (such as being called gay). Moreover, a 1995 NCES report found substantial bullying, physical attacks, and robbery in schools, and that "boys were more likely to be victimized at school than were girls (14 versus 9 percent , respectively)" (Nolin et al., 1995). Thus, the matter of safety and harassment in schools is not uni-directional.

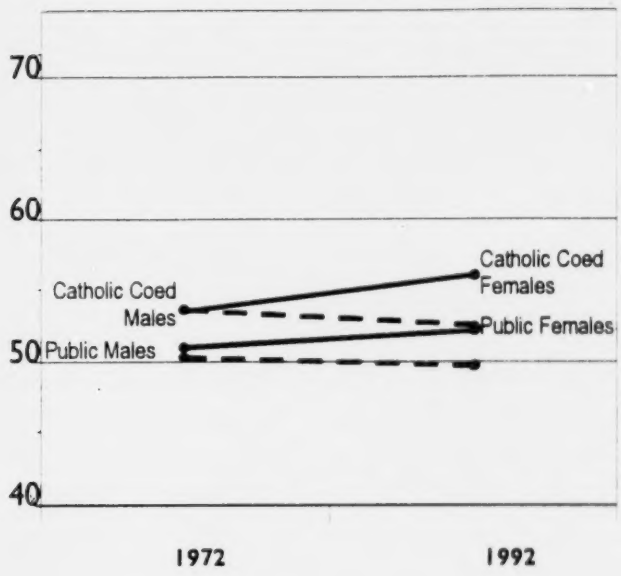
Another issue is that educational outcomes do not transfer immediately into changes beyond the classroom. Ultimately, educational advantages for females, should they persist, will lead to greater equity in occupational attainment and income. But this is not yet a reality.

Women continue to be undervalued in the work place, excluded from leadership posts in many occupations, and underpaid relative to equally qualified men. This issue can be conceived as the distinction between getting "into" the proverbial pipeline and getting "through" the pipeline (Neumann, 1999). Also, victimization in spousal abuse is rampart and females are virtually always on the short end of the gender gap in this arena. Finally, as demonstrated in this paper, girls are now doing less homework and working more part-time after school.

There are several ways of interpreting the implications of these findings. Some people would argue that in the not too distant past females were on the bottom end of the gender gap on virtually all education outcome indicators. Based on the 1972 results alone, one can easily imagine that in 1962 and backwards, the effect size gender gap favoring males would have been quite large. For example, although women in 1997 are more likely than men to have completed four years of college or more (29 versus 26 percent), men still hold a lead in college completion for the total 1997 population age 25 and older by 26 to 22 percent (U. S. Census Bureau, 1998). Thus, one could easily conclude that the movement towards gender equity is not yet complete. Conceivably, gender equity might require more than an equal opportunity structure and more than equal outcomes, given the long history of gender stratification in schools and in society.

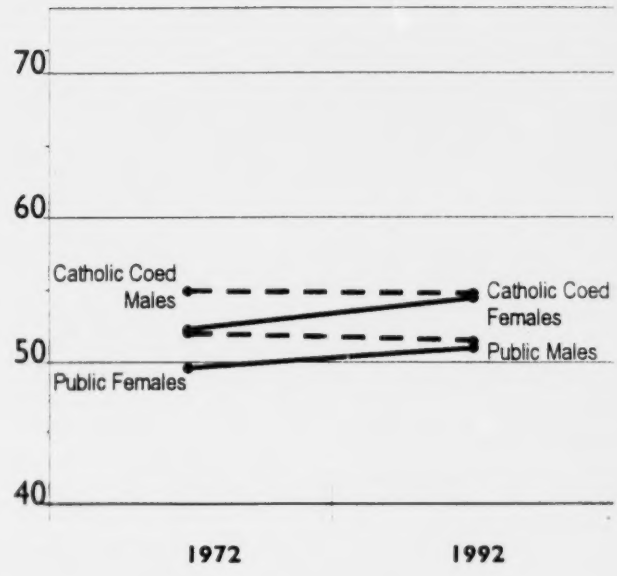
On the other hand, as we prepare to move into the 21st Century, we also must recognize that boys are not flourishing in school. This being the case, the educational needs of boys should be more closely monitored over the next decade, perhaps leading to a more balanced approach to the study of gender equity.

Figure 1



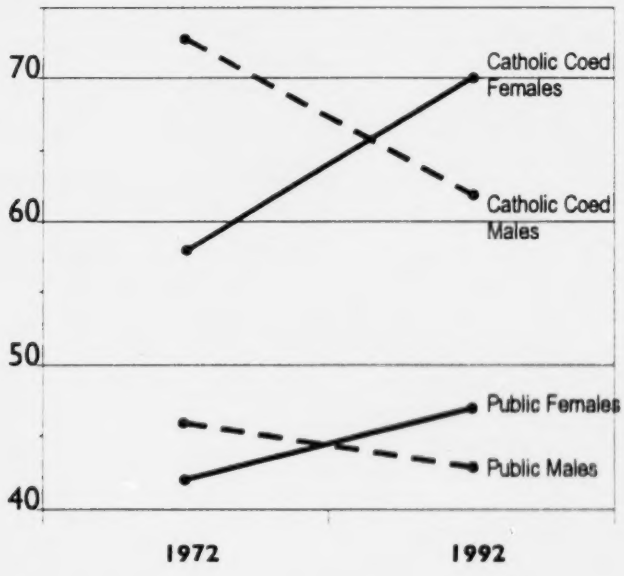
Reading Test Scores
(Public and Coeducational Catholic Schools)

Figure 2



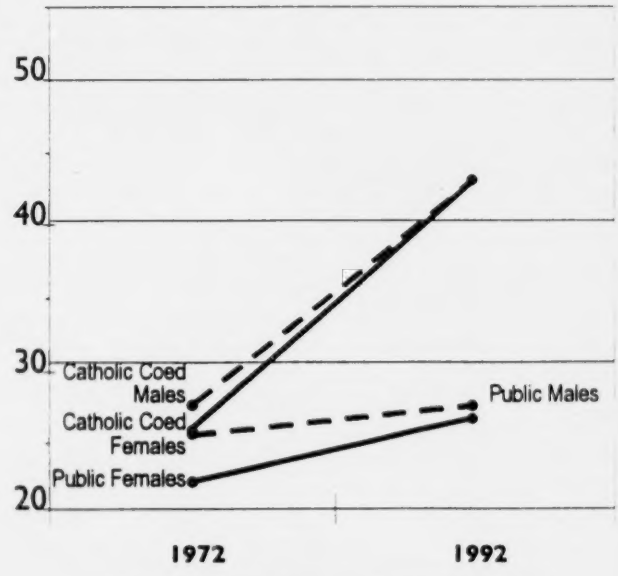
Mathematics Test Scores
(Public and Coeducational Catholic Schools)

Figure 3



Track Placement (% College)
(Public and Coeducational Catholic Schools)

Figure 4



Socioeconomic Composition
(% Highest Quartile)
(Public and Coeducational Catholic Schools)

Table 1								
Female/Male Differences on Selected Variables by School Type (Effect Sizes) Controlling for Background Characteristics Within School Type								
	Public				Coeducational Catholic			
Outcome Variable	1972	1980	1992	Gain	1972	1980	1992	Gain
Mathematics Test	-.23	-.17	-.04	.19	-.32	-.22	.01	.31
Reading Test	.08	.05	.28	.20	-.03	.09	.48	.51
% College Track	-.06	.04	.09	.15	-.11	-.10	.18	.29
Sub-Average	-.07	-.03	.11	.18	-.15	-.08	.22	.37
Hrs/Wk Homework	.42	.32	.17	-.25	.45	.32	.24	-.21
Hrs/Wk Working[a]	.37	.33	.11	-.26	.32	.46	-.05	-.37
Sub-Average	.40	.33	.14	-.26	.39	.39	.10	-.29
Number of Cases	11903	21040	11863		479	1006	466	

Note: + favors females; - favors males; in public schools, effects above .07 are significant at .05

All effect sizes estimated using the weighted sample; significance levels obtained by including an adjusted weight which takes into account the design effect and decreases the sample size; specifically, NEW WEIGHT =(OLD WEIGHT/Mean of the OLD WEIGHT)/Design Effect. For items that were dichotomous, a logit regression was used to confirm the results of the OLS analysis.

[a]This item is reverse coded, i.e., girls score low which is interpreted as a positive effect.

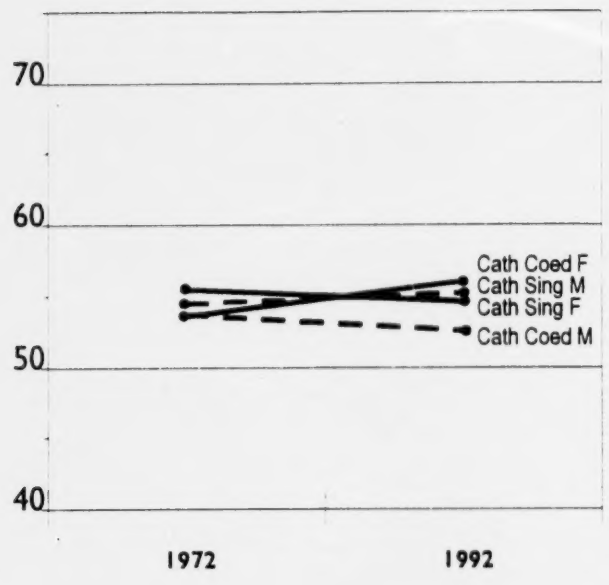
Table 2								
Female/Male Differences on Selected Variables by School Type (Effect Sizes) Controlling for Background Characteristics Across School Type								
	Public				Coeducational Catholic			
Outcome Variable	1972	1980	1992	Gain	1972	1980	1992	Gain
Mathematics Test	-.26	-.24	-.07	.19	-.26	-.24	-.17	.09
Reading Test	.06	.00	.27	.21	.03	.07	.21	.18
% College Track	-.08	.00	.08	.16	-.23	-.16	-.03	.20
Sub-Average	-.09	-.08	.09	.18	-.15	-.11	.00	.15
Hrs/Wk Homework	.44	.29	.20	-.24	.51	.27	.23	-.28
Hrs/Wk Working[a]	.37	.34	.13	-.24	.39	.48	.13	-.26
Sub-Average	.41	.32	.17	-.24	.45	.38	.18	-.27
Number of Cases	11818	21672	10026		479	1006	466	

Note: + favors females; - favors males; in public schools, effects above .07 are significant at .05

All effect sizes estimated using the weighted sample; significance levels obtained by including an adjusted weight which takes into account the design effect and decreases the sample size; specifically, NEW WEIGHT =(OLD WEIGHT/Mean of the OLD WEIGHT)/Design Effect. For items that were dichotomous, a logit regression was used to confirm the results of the OLS analysis.

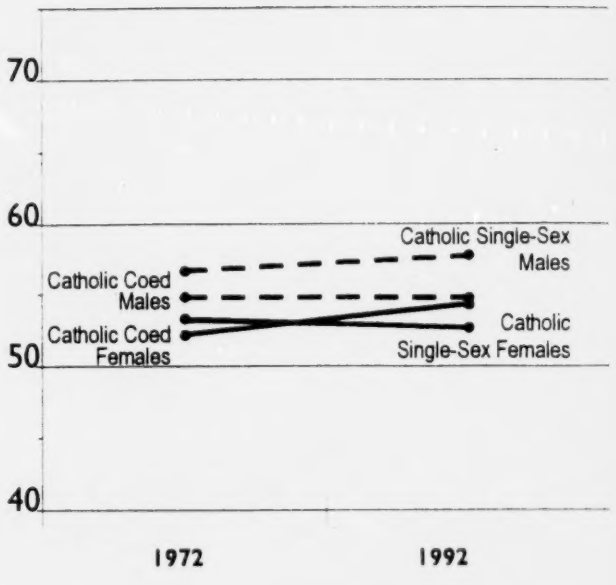
[a] This item is reverse coded, i.e., girls score low which is interpreted as a positive effect.

Figure 5



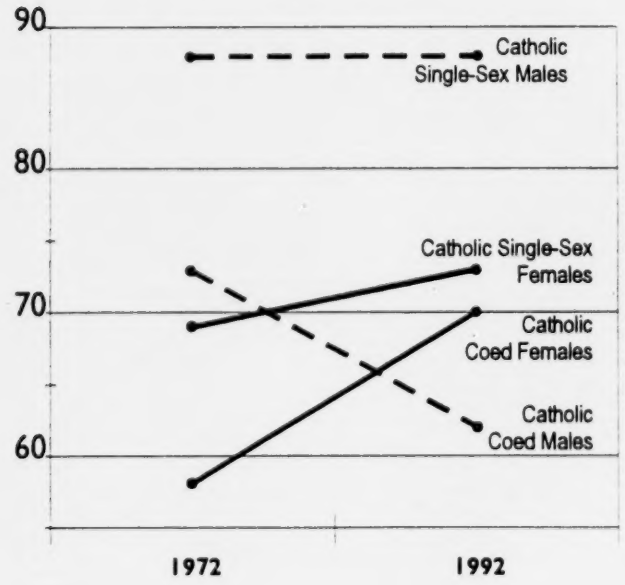
Reading Test Scores
(Catholic Single Sex and Coeducational Schools)

Figure 6



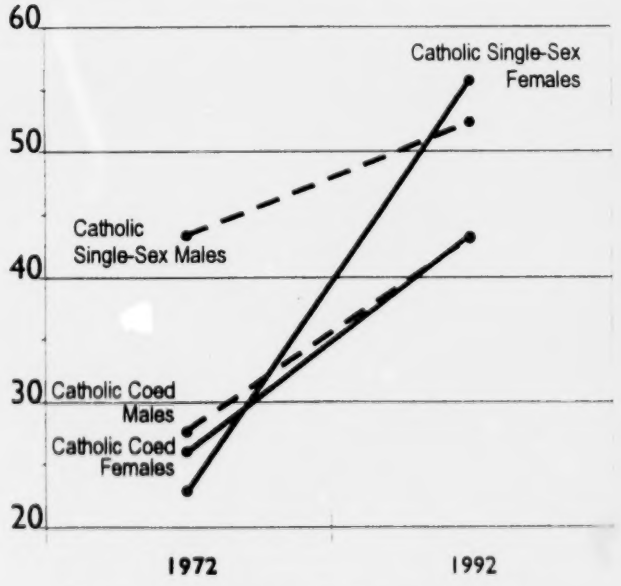
Mathematics Test Scores
(Catholic Single Sex and Coeducational Schools)

Figure 7



Track Placement (% College)
(Catholic Single Sex and Coeducational Schools)

Figure 8



Socioeconomic Composition
(% Highest Quartile)
(Catholic Single Sex and Coeducational Schools)

Table 3

Female/Male Differences on Selected Variables in Catholic Schools (Effect Sizes)

	Single Sex Females/Coed Males				Coed Females and Males				Single Sex Females/Males			
Outcome Variable	1972	1980	1992	Gain	1972	1980	1992	Gain	1972	1980	1992	Gain
Mathematics Test	-.28	-.10	-.16	.12	-.32	-.22	.01	.31	-.40	-.37	-.37	.03
Reading Test	.19	.16	.33	.14	-.03	.09	.48	.51	.25	-.12	.05	-.20
% College Track	-.20	.12	.38	.58	-.11	-.10	.18	.29	.14	-.16	-.28	-.42
Sub-Average	-.10	.09	.18	.28	-.15	-.08	.22	.37	-.01	-.22	-.20	-.19
Hrs/Wk Homework	.67	.67	.44	-.23	.45	.32	.24	-.21	.51	.47	.19	-.32
Hrs/Wk Working[a]	.52	.38	.14	-.38	.32	.46	-.05	-.37	.54	.41	.06	-.48
Sub-Average	.60	.53	.29	.31	.39	.39	.10	-.29	.53	.44	.13	-.40
Number of Cases	444	1315	312		479	1006	466		439	1504	250	

Note: + favors females; - favors males; effects above .20 are significant at .05 except for in single sex schools in 1992 where effects above .28 are significant at .05. All effect sizes estimated using the weighted sample; significance levels obtained by including an adjusted weight which takes into account the design effect and decreases the sample size; specifically, NEW WEIGHT =(OLD WEIGHT/Mean of the OLD WEIGHT)/Design Effect. For items that were dichotomous, a logit regression was used to confirm the results of the OLS analysis.

[a] This item is reverse coded, i.e., girls score low which is interpreted as a positive effect.

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Appendix A

Descriptions of the Data Sets Used in the Analysis

National Longitudinal Study (NLS) NLS is a two stage probability sample, with schools as first stage units and students as second stage units. The base year questionnaire was administered in the spring of 1972 to 16,683 twelfth grade high school students who were enrolled in 1,070 public, private, and church-affiliated schools in the United States. Of these, 74 were Catholic schools. A total of 1027 students were obtained in the Catholic school sample. The analysis, however, will be limited to those students who had not transferred into the school after the 9th grade. The NLS survey conducted follow-ups in 1973, 1974, 1976, 1979, and 1986.

High School & Beyond (HSB) HSB is also a two stage probability sample, with schools as first stage units and students as second stage units. The base year questionnaire was administered in 1980 to 58,270 students in 1,015 public, private, and church related school. The sample included a sophomore and senior cohort. For most of the analysis, only the senior cohort was employed since the sophomore cohort is no longer a representative sample at the senior year (see Green, 1995). The senior cohort is composed of 28,240 students of which 2,687 attended 84 Catholic schools. Follow-up surveys were conducted on the HSB senior cohort in 1982, 1984, and 1986, but all of the variables used in this analysis were part of the 1980 base year survey. For long term analyses only, the sophomore cohort will be employed and compared to long term results in NLS.

National Educational Longitudinal Study (NELS) NELS is a two stage probability sample, with schools as first stage sampling units and students as second stage units. The base year questionnaire was administered in the spring of 1988 to 24,599 eighth -graders who were enrolled in 1,052 public and private schools in the United States. Of these, 104 were Catholic schools. On average, each of the participating schools was represented by 23 student participants. In the first follow-up administered in the spring of 1990, most respondents had changed schools between the eighth and tenth grade. Thus, at this point, there were 21,474 student participants, including 1,229 "freshened" sample students who attended 3,967 schools. A total of 17,424 students completed the survey in both the base and first follow-up. For the second follow-up in spring 1992, NCES decided to follow with certainty those students who were members of the first follow-up along with 1,126 "freshened" sample senior year students. This yielded 16,114 students who completed the senior year questionnaire (not all of these have 8th and/or 10th grade data available).

Appendix B

Variables Used in the Controlled Analyses of Public and Catholic School Students

NELS92

F2SES1 Socioeconomic Status of Student (mean=0, sd=1)

F2RACE1 Student's racial identity (white=1; minority=0)

RELIGION Composite of Measures on Religion from 1990 and in 1992 (for the freshened member of the sample (Catholic=1, All Others=0)

REGION Four dummy variables with West as the omitted category

FAMCOMP A Composite variable drawing on a measure in 1988 asking if the respondent lived with their mother and their father or some other arrangement, and later in 1990 and 1992 asking if the respondent's mother or father had divorced or died during the previous two years.

G12CTRL School Type (Catholic and Public)

G12URBN3 Degree of Urbanicity (Urban, Suburban, Rural)

HSB80

BBSESRAW Socioeconomic Status of Student (mean=0, sd=1)

BB089 Student's racial identity (white=1; minority=0)

BB091 Student's Religion in 1972 (Catholic=1, All Others=0)

CENRGN Four dummy variables with West as the omitted category

FAMCOMP A Composite variable drawing on a measures in 1980 asking if the respondent lived with their mother and their father or some other arrangement.

SCHLTYPE School Type (Catholic and Public)

- NLS72

SESRAW Socioeconomic Status of Student (mean=0, sd=1)

CRACE Student's racial identity (white=1; minority=0)

BQ92 Student's Religion in 1972 (Catholic=1, All Others=0)

REGION Four dummy variables with West as the omitted category

FAMCOMP A Composite variable drawing on a measure in 1986 asking if the respondent lived with their mother and their father or some other arrangement.

PUBPRIV School Type (Catholic and Public)

SCHQ40 Degree of Urbanicity (Urban, Suburban, Rural) A small city less than 50,000 that was not a suburb of a larger place was coded as rural.

Note: For outcomes that occur beyond high school, I will also use senior year test scores and track (curriculum) placement as controls.

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